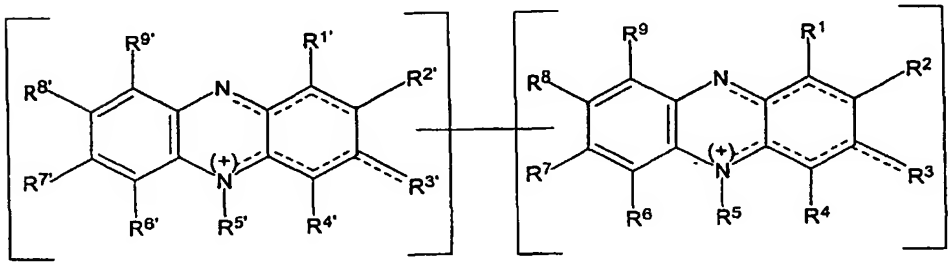
Claims:

1. A mixture of oligomeric phenazinium compounds, containing at least one phenazinium compound selected from the group comprising

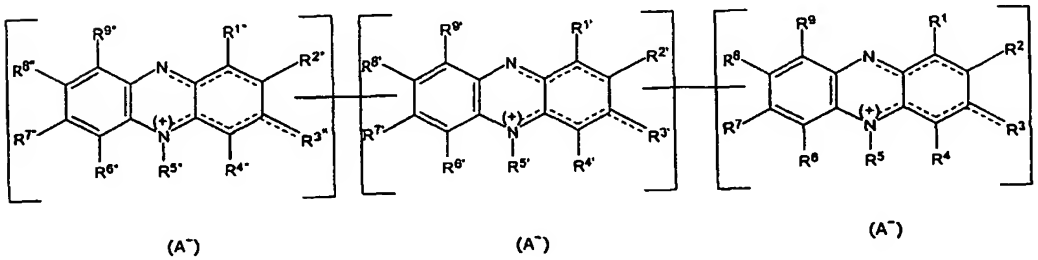
a) compounds containing two monomeric units having the following general chemical formula <I>:



<I>

and

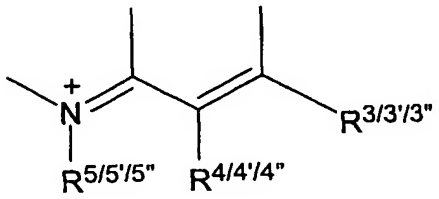
b) compounds containing three monomeric units having the following general chemical formula <II>:



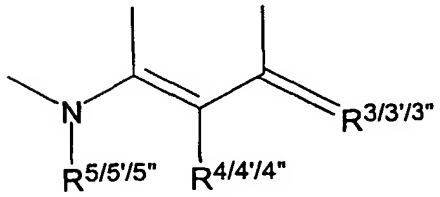
<II>

as well as further oligomeric phenazinium compounds,

wherein, in the aforementioned general chemical formulae <I> and <II>, the structure unit $N(R^{5/5'/5"})CC(R^{4/4'/4"})C(R^{3/3'/3"})$ has one of the general chemical formulae <IIIa> or <IIIb>:



<IIIa>



<IIIb>

wherein further

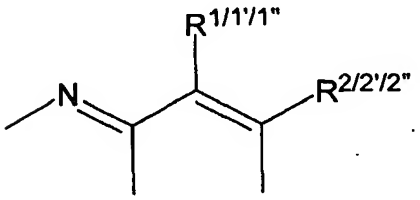
R^1, R^2, R^3, R^4, R^6, R^7, R^8, R^9, $R^{1'}$, $R^{2'}$, $R^{3'}$, $R^{4'}$, $R^{6'}$, $R^{7'}$, $R^{8'}$, $R^{9'}$, $R^{1"}$, $R^{2"}$, $R^{3"}$, $R^{4"}$, $R^{6"}$, $R^{7"}$, $R^{8"}$ and $R^{9"}$ have each independently one of the meanings selected from the group comprising hydrogen, halogen, amino, OH, CN, SCN, SH, COOH, COO salt, COO ester, SO_3H, SO_3 salt, SO_3 ester, lower alkyl, aryl and heteroaryl as well as a single bond that links the individual monomeric units together,

R^5, $R^{5'}$ and $R^{5"}$ denote each independently the same as R^1, R^2, R^3, R^4, R^6, R^7, R^8, R^9, $R^{1'}$, $R^{2'}$, $R^{3'}$, $R^{4'}$, $R^{6'}$, $R^{7'}$, $R^{8'}$, $R^{9'}$, $R^{1"}$, $R^{2"}$, $R^{3"}$, $R^{4"}$, $R^{6"}$, $R^{7"}$, $R^{8"}$ and $R^{9"}$ with the proviso that they do not represent a single bond,

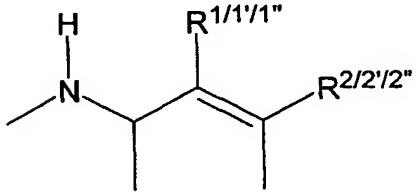
R^2, $R^{2'}$, $R^{2"}$, R^3, $R^{3'}$ and $R^{3"}$ may additionally be selected from the group comprising oxo, imino and methylene with the proviso that a monomeric unit substituted by oxo, imino or methylene comprises the structure unit $N(R^{5/5'/5"})CC(R^{4/4'/4"})C(R^{3/3'/3"})$ of the

general chemical formula <IIIb>,

wherein further, if R^2, $R^{2'}$, $R^{2''}$, R^3, $R^{3'}$ and $R^{3''}$ are not oxo, imino or methylene, the structure unit $NCC(R^{1/1'/1''})C(R^{2/2'/2''})$ has one of the following general chemical formulae <IVa> or <IVb>:



<IVa>



<IVb>

wherein further A^- is an acid anion and

wherein further all of the oligomeric phenazinium compounds having the general chemical formulae <I> and <II> are contained in the mixture in an amount of at least about 80 mol-%.

2. The mixture of oligomeric phenazinium compounds according to claim 1, wherein at least one of the residues selected from the group comprising R^2, $R^{2'}$, $R^{2''}$, R^3, $R^{3'}$ $R^{3''}$, R^7, $R^{7'}$, $R^{7''}$, R^8, $R^{8'}$ and $R^{8''}$ has one of the meanings selected from the group comprising halogen and hydroxy.

3. The mixture of oligomeric phenazinium compounds according to one of the preceding claims, wherein at least one of the residues selected from the group comprising R^2, R^3, $R^{7''}$ and $R^{8''}$ in the oligomeric phenazinium

compounds according to the general chemical formula <II> has one of the meanings selected from the group comprising halogen and hydroxy.

4. The mixture of oligomeric phenazinium compounds according to one of the preceding claims, wherein at least one of the residues selected from the group comprising R^2, $R^{2'}$ and $R^{2''}$ represents lower alkyl.

5. The mixture of oligomeric phenazinium compounds according to claim 4, wherein lower alkyl is methyl or ethyl.

6. The mixture of oligomeric phenazinium compounds according to one of the preceding claims, wherein at least one of the residues selected from the group comprising R^7, $R^{7'}$, $R^{7''}$ represents an alkylated amine.

7. The mixture of oligomeric phenazinium compounds according to claim 6, wherein the alkylated amine is selected from the group comprising N-methylamine, N-ethylamine, N,N-dimethylamine and N,N-diethylamine.

8. The mixture of oligomeric phenazinium compounds according to one of the preceding claims, wherein at least one of the residues selected from the group comprising R^5, $R^{5'}$ and $R^{5''}$ represents methyl or an aryl group.

9. The mixture of oligomeric phenazinium compounds according to claim 8, wherein the aryl group is phenyl or tolyl.

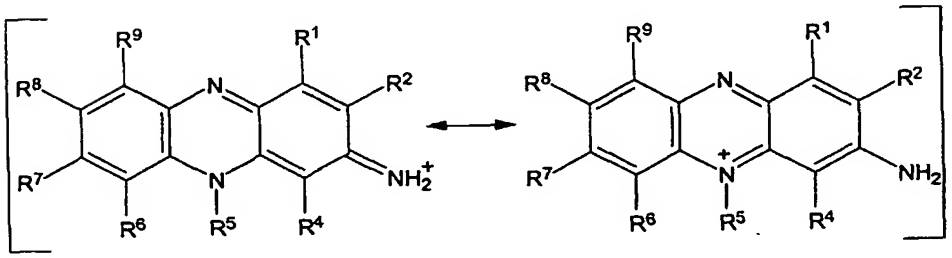
10. The mixture of oligomeric phenazinium compounds according to one of the preceding claims, wherein the acid anion A^- is selected from the group comprising sulfate, hydrogen sulfate, halide, tetrafluoroborate, hexafluorophosphate, nitrate, acetate, trifluoroacetate and methanesulfonate.

11. The mixture of oligomeric phenazinium compounds according to one of

the preceding claims, wherein the monomeric units in the compounds are selected from the group comprising

a) 7-N,N-dimethylamino-3-hydroxy-2-methyl-5-phenyl-phenazinium
b) 3-chlorine-7-N,N-dimethylamino-5-phenyl-phenazinium
c) 8-dimethylamino-10-phenyl-10H-phenazine-2-one
d) 2-N,N-dimethylamino-10-phenyl-5,10-dihydrophenazine
e) 3-N-ethylamino-7-hydroxy-5-phenyl-phenazinium
f) 3-chlorine-7-N-ethylamino-5-phenyl-phenazinium
g) 3-methyl-8-N-methylamino-10-phenyl-10H-phenazine-2-one
h) 7-N-methylamino-2-methyl-5-phenyl-5,10-dihydrophenazine

12. The mixture of oligomeric phenazinium compounds according to one of the preceding claims, wherein the mixture is produced by diazotation of at least one monomeric phenazinium compound of the following general chemical formula <IX>:



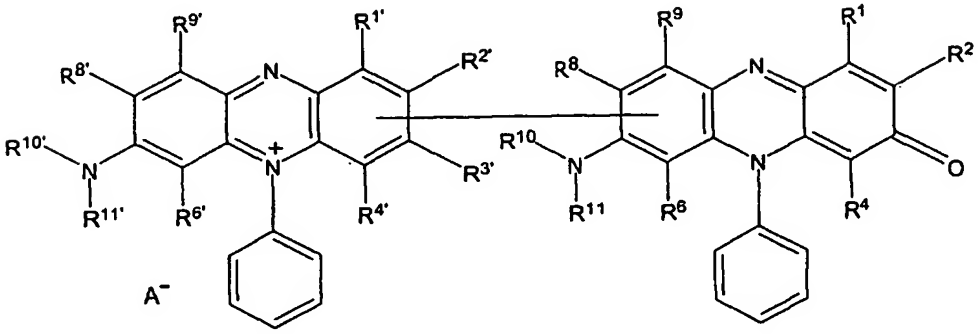
<IX>

wherein R^1, R^2, R^4, R^5, R^6, R^7, R^8 and R^9 have the same meanings as given before

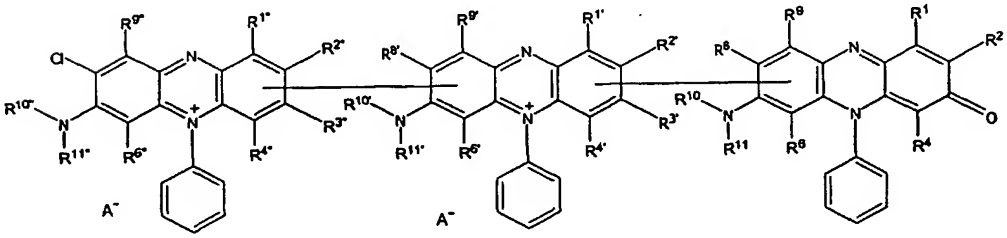
and by reacting the resulting diazonium compounds in a one-pot reaction to form the oligomeric phenazinium compounds.

13. The mixture of oligomeric phenazinium compounds according to one of the preceding claims, wherein the compounds have chemical formulae

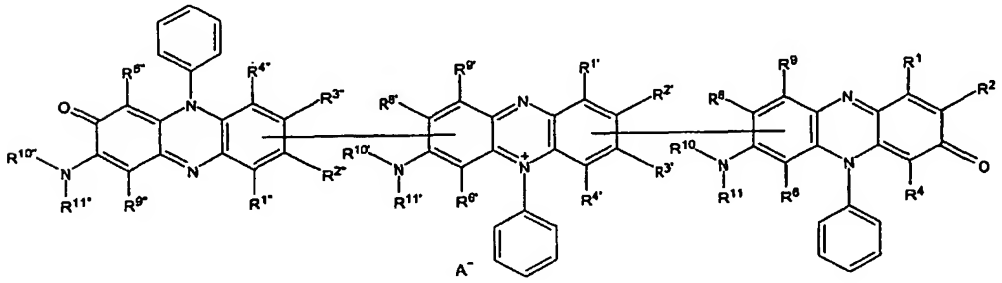
selected from the group comprising:



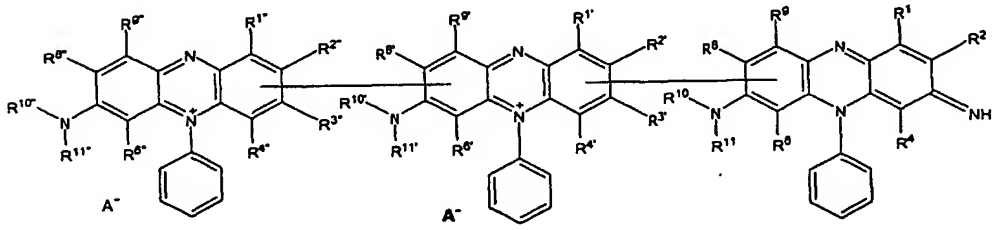
<V>



<VI>



<VII>



<VIII>

wherein R^1, R^2, R^4, R^6, R^8, R^9, $R^{1'}$, $R^{2'}$, $R^{3'}$, $R^{4'}$, $R^{6'}$, $R^{8'}$, $R^{9'}$, $R^{1''}$, $R^{2''}$, $R^{3''}$,

$R^{4''}$, $R^{6''}$, $R^{8''}$ and $R^{9''}$ have the above mentioned meanings and wherein R^{10}, R^{11}, $R^{10'}$, $R^{11'}$, $R^{10''}$ and $R^{11''}$ represent hydrogen or lower alkyl.

14. The mixture of oligomeric phenazinium compounds according to one of the preceding claims, wherein they are selected from the group comprising:

i. 3'-N,N-dimethylamino-3,8'-dimethyl-8-(N-methylamino)-7'-oxo-10,5'-diphenyl-5',7'-dihydro-[2,2']biphenazinyl-10-ium-chloride

ii. 3,8',8"-trimethyl-8,3',3"-tris-(N-methylamino)-7"-oxo-10,5',5"-triphenyl-5',10',5",7"-tetrahydro-[2,2';7',2"]terphenazine-10-ium-chloride

iii. 8,3'-bis-(N,N-dimethylamino)-8'-methyl-7'-oxo-10,5'-diphenyl-5',7'-dihydro-[2,2']biphenazinyl-10-ium-hydrogen sulfate

iv. 8,8'-bis-(N,N-dimethylamino)-3,3'-dimethyl-10,10'-diphenyl-[2,2']biphenazinyl-10,10'-ium-tetrafluoroborate

v. 8,8'-bis-(N,N-dimethylamino)-10,10'-diphenyl-3-methyl-[2,2']biphenazinyl-10,10'-ium-tetrafluoroborate

vi. 3,8'-bis-(N,N-dimethylamino)-8,3'-dimethyl-5,10'-diphenyl-7-hydroxy-[2,2']biphenazinyl-5,10'-ium-tetrafluoroborate

vii. 3,8'-bis-(N,N-dimethylamino)-8,3'-dimethyl-5,10'-diphenyl-7-hydroxy-[2,2']biphenazinyl-5,10'-ium-chloride

viii. 3,8',8"-tris-(N,N-dimethylamino)-8-methyl-5,10',10"-triphenyl-[2,2';7',2"]terphenazine-5,10',10"-ium-tetrafluoroborate

ix. 8'-N,N-diethylamino-8-N,N-dimethylamino-3-methyl-10,10'-diphenyl-[2,2']biphenazinyl-10,10'-ium-sulfate

x. 8'-N,N-diethylamino-3-N,N-dimethylamino-7-hydroxy-8-methyl-5,10'-diphenyl-[2,2']biphenazinyl-6,10'-ium-sulfate

xi. 8,3',3"-tris-(N,N-dimethylamino)-7"-oxo-10,5',5"-triphenyl-5',10',5",7"-tetrahydro-[2,2';7',2"]terphenazine-10-ium-hydrogen sulfate

xii. 3,8'-bis-(N,N-diethylamino)-7-hydroxy-5,10'-diphenyl-

[2,2']biphenazinyl-6,10'-ium-sulfate

xiii. 7-chlorine-3,8'-bis-(N,N-dimethylamino)-5,10'-diphenyl-8-methyl-[2,2']biphenazinyl-5,10'-ium-chloride

xiv. 7-chlorine-3,8'-bis-(N,N-dimethylamino)-8,3'-dimethyl-5,10'-diphenyl-[2,2']biphenazinyl-5,10'-ium-chloride

xv. 7-chlorine-3,8'-bis-(N,N-dimethylamino)-5,10'-diphenyl-[2,2']biphenazinyl-5,10'-ium-chloride

xvi. 7-chlorine-3,8',8"-tris-(N,N-dimethylamino)-8,3'-dimethyl-5,10',10"-triphenyl-[2,2';7',2"]terphenazinyl-5,10',10"-ium-chloride

xvii. 7-chlorine-8,1'-dimethyl-8'-N,N-dimethylamino-5,10'-diphenyl-[2,2']biphenazinyl-5,10'-ium-chloride

xviii. 8,8'-bis-(N,N-dimethylamino)-10,10'-dimethyl-[2,2']biphenazinyl-10,10'-ium-hydrogen sulfate

xix. 8,3',3"-tris-(N,N-dimethylamino)-7"-oxo-10,5',5"-triphenyl-5",7"-dihydro-[2,2';7',2"]terphenazine-10,5'-ium-hydrogen sulfate

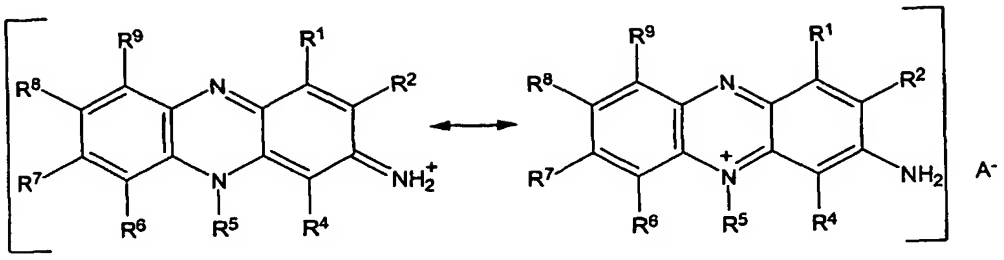
xx. 8,3',3"-tris-(N,N-dimethylamino)-8-methyl-5,10',10"-triphenyl-[2,2';7',2"]terphenazine-5,10',10"-ium-tetrafluoroborate

xxi. 8,8'-bis-(N,N-dimethylamino)-10,10'-diphenyl-[2,2']biphenazinyl-10,10'-ium-tetrafluoroborate

xxii. 8,8'-bis-(N-methylamino)-3-chlorine-10,10'-diphenyl-[2,2']biphenazinyl-10,10'-ium-chloride

xxiii. 3,3',3"-tris-(N-methylamino)-8"-chlorine-5,5',5"-triphenyl-[8,2';8',7"]terphenazine-5,5',5"-ium-chloride.

15. A method of preparing the mixture of oligomeric phenazinium compounds according to one of claims 1 - 14, wherein at least one monomeric phenazinium compound of the following general chemical formula <IX>:



<IX>

wherein R^1, R^2, R^4, R^5, R^6, R^7, R^8 and R^9 have the same meanings as given before,

is diazoted and the diazonium compounds formed in the diazotation reaction are reacted to the mixture of oligomeric phenazinium compounds in a one-pot reaction.

16. The method according to claim 15, wherein the monomeric phenazinium compounds of the general chemical formula <IX> are selected from the group comprising safranine dyestuffs in which R^1, R^4, R^6 and R^9 each represent hydrogen, R^5 represents phenyl and R^7 represents $NR^{10}R^{11}$, wherein R^{10} and R^{11} each independently have one of the aforementioned meanings.

17. The method according to one of claims 15 and 16, wherein

a) the safranine or the mixture of safranines is suspended in mineral acid and

b) a nitrite or nitrosyl sulfuric acid is added to the suspension of the safranine or the mixture of safranines in the mineral acid at a temperature of at least 15°C.

18. The method according to claim 17, wherein the mineral acid is selected from the group comprising hydrochloric acid, sulfuric acid, tetrafluoroboric acid, hexafluorophosphoric acid, phosphoric acid, hydrobromic acid and the mixtures thereof.

19. The method according to one of claims 15 - 18, wherein the resulting diazonium compounds are reacted to form the mixture of oligomeric phenazinium compounds in the presence of a catalyst made of metal, selected from the group comprising copper, nickel, palladium and iron or of compounds of these metals, or of compounds selected from the group comprising alkali xanthogenates, alkali thiocyanates and alkali selenocyanates.

20. The method according to claim 19, wherein the metal compounds are selected from the group comprising oxides, halides and pseudohalides of the metals.

21. The method according to one of claims 19 and 20, wherein the catalyst is in the form of a powder.

22. An acidic bath for electrolytically depositing a copper deposit, said acidic bath containing oligomeric phenazinium compounds, wherein the oligomeric phenazinium compounds are contained in the form of the mixture according to one of claims 1 - 14.

23. The acidic bath according to claim 22, wherein the mixture of the oligomeric phenazinium compounds is contained in a concentration of 0.00005 - 0.1 g/l.

24. The acidic bath according to one of claims 22 and 23, wherein it additionally contains compounds selected from the group comprising nitrogen containing sulfur compounds and polymeric nitrogen compounds.

25. The acidic bath according to claim 24, wherein the concentration of the nitrogen containing sulfur compounds and the polymeric nitrogen

compounds contained together in the bath is 0.0001 - 0.50 g/l.

26. A method of electrolytically depositing a copper deposit by which a workpiece and an anode are contacted with a bath containing copper ions and the mixture according to one of claims 1 - 14, and a flow of electric current is generated between the workpiece and the anode.

27. Use of the method according to claim 26 for depositing a highly bright, leveled copper deposit for the purpose of producing decorative surfaces.

28. Use of the method according to claim 26 for forming a copper deposit on printed circuit boards provided with blind microvias.

29. Use of the method according to claim 26 for forming a copper deposit on semiconductor substrates provided with high aspect-ratio recesses.